December 1981

PRODUCTION

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COMPUTERS IN MANUFACTURING '82

The Challenge: Tying It All Together

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It is the purpose of **PRODUCTION** to recognize and to fulfill the special needs of the managers and engineers who are responsible for improving manufacturing efficiency, costs and quality in production metalworking plants, and selected supplier industries.

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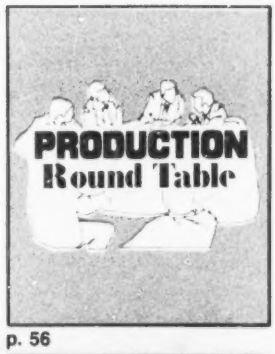

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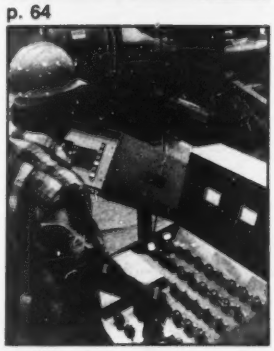
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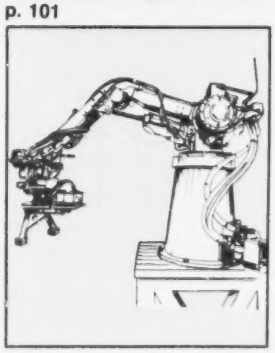
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Cover: Interfacing computers and manufacturing operations remains a problem

Next Month: Focusing on higher machine uptime

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Surge to Robots Is On

"**WARNING:** Use of this device will be habit-forming!" That label isn't being affixed to the robots going into use in the country's industrial plants; but by all indications from current users, planned users, and somewhat overwhelmed builders, robots' capability for solving across-the-board manufacturing problems now is widely recognized

PRODUCTION's survey of the metalworking industry's capital spending plans for next year is currently being analyzed in depth, but one strong trend was clear from the moment the returns started coming in: Robots are *the* action area.

A minor percentage of industrial plants (7.2% of the sample) were utilizing robots in production in the fall of 1981. A larger percentage (19.9%) were working with them in manufacturing research projects. But an indicated 21.6 percent say their capital spending plans for 1982-84 include the purchase of robots.

Equally impressive is the universality of these spending plans within all of the metalworking industries served by PRODUCTION. The sharp visibility given to the automotive industry's robotics applications and its declared intentions to even more aggressively increase the installation rate has made the Detroit area mecca for robot builders. And that industry's heavy past commitment to robotic spot welding has resulted in a sharp distortion of the application picture from what is likely ultimately to appear.

Confirmation of the across-the-board red-hot interest in robots came in the unprecedented reader requests for extra copies of PRODUCTION's September article ("The CEO Befriends the Robot . . . But Manufacturing Must Make It Work") which also offered a bibliography of articles and a Directory of Robot and Robot-Related Accessory Builders. (This Directory follows this article.)

Spot checks with people asking for this material (primarily manufacturing engineers and production managers with a heavy interlacing of presidents and vice presidents) revealed that many are, in fact, in the process of planning a robot's installation. The decision for it has been made.

The intensity of interest also surfaced in the overflow attendance at the Robotics International's day-long "Executive Overview of Robots' Contribution to Productivity" at Chicago's Ramada O'Hare Inn on Sept. 30 and the ballroom-filling group that turned out in the Hotel Pontchartrain in Detroit on Oct. 13 for the entry announcement of a finishing robot by newly formed Graco Robotics, Inc., Livonia, MI.

The Chicago RI meeting, addressed by representatives of three robot builders—Cincinnati Milacron, Unimation and Prab—and by three major users—General Electric, Westinghouse and General Motors—with overviews also by the UAW and the Institute of Science & Technology/University of Michigan, provided additional concrete evidence of the massive impact robots are starting to have on the way manufacturing operations of all kinds are performed. The Detroit conference, "Finishing '81," contributed insights into one particular application area served by five spray painting robot suppliers—Nordson, DeVilbiss, Cybotech, Binks and Graco.

Doubts have been raised whether the leading domestic user of robots, General Motors, would meet its 1990 "target" for robot utilization of 14,000 units. In Chicago, Thomas O. Mathues, vp-manufacturing, revealed those sights have in fact been raised; the number is likely to be between 14,000 and 20,000. General Electric, currently using 200, will "have well over 1000 in its plants by 1984," according to James A. Baker, executive vp-Technical Systems Sector.

Application Excitement. Unimation's Joseph F. Engelberger, whose first robot installation was at General Motors in 1961 for a die casting machine unloading operation, notes that machine tool loading/unloading, which he had originally expected would be the

major market, now is emerging in that role.

Engelberger's assessment of application areas showing strong current growth coincides in many ways with that shown below by PRODUCTION's capital spending survey.

Spot welding, Engelberger says, accounts for almost half of the robots used now in U.S. plants. By 1985, however, this market will be almost entirely replacement.

"The hottest area today," he reports, "is machine loading."

Robotic arc welding is growing but needs rudimentary vision for seam tracking before its full potentials will be realized. "Ninety percent of the eventual arc welding applications will require sensory perception," he suggests.

"Just coming into its own" is application to stamping, he points out. The robot's lack of speed has been the blockage, and a new high-speed Unimate has been developed for that market, he tells PRODUCTION. Changeover of presses and robots in less than an hour will be an important advantage.

In conveyor transfer of parts and their palletizing, "there are lots of things on the horizon," he says. Picking parts from one supply conveyor and moving them to an operation-serving conveyor is not the simple robotic job it might appear. "This activity, in fact, requires a quite bright robot," he contends.

A manufacturing process that is owing much of its current growth to robotics is investment casting, Engelberger notes. The series of steps in pattern making now can be performed easily and consistently.

The assembly robot is getting intense attention in Japan and may revolutionize that country's style of one-shift assembly operations, requiring multi-shift use for justification. In assembly, "the driving impetus is economics," he says.

Die casting, injection molding, heat treating, and glass handling are other areas of major robotic interest.

A User's View. General Electric's dedication to robots, first as a user and, recently, as a supplier (of the Hitachi and DEA units), was told to the Chicago RI audience by Baker.

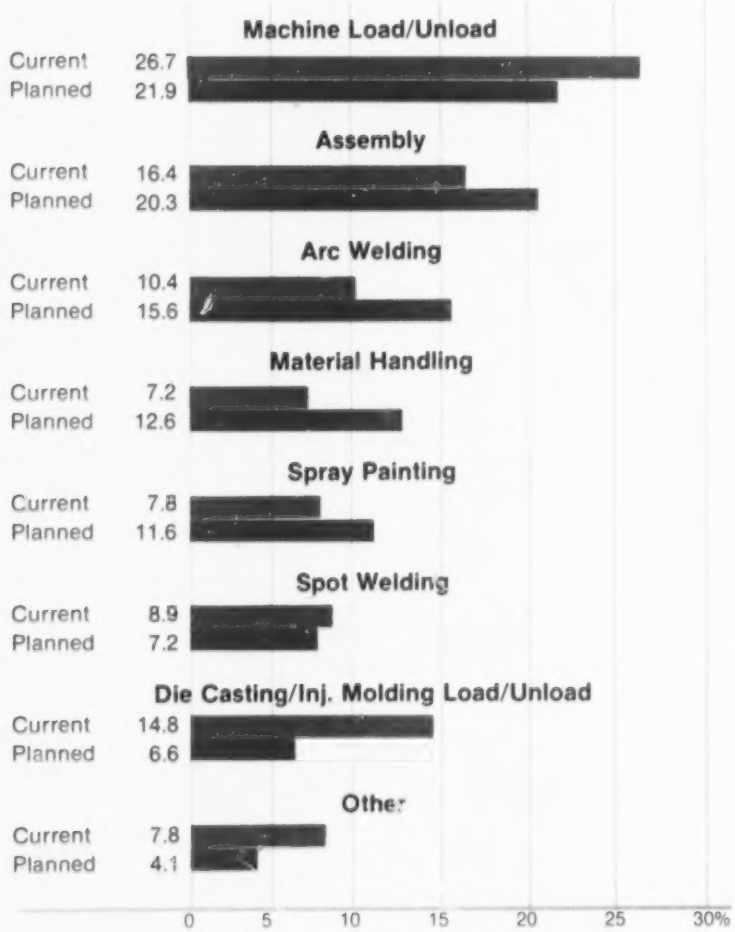
Starting with a manufacturing technology study the company did in the mid-'70s, "we felt the technology had matured to the point where it was time to jump in with both feet," he said.

An evaluation and training facility equipped with four robots was set up at Schenectady, NY, in 1977. This lab, which focuses on advanced robotic technology and adapting it to GE's needs, now operates 20 robots. A "Rent-a-Robot" program was started for furnishing units to plants on a try-out basis.

Baker reports that the most common current usage in GE is for

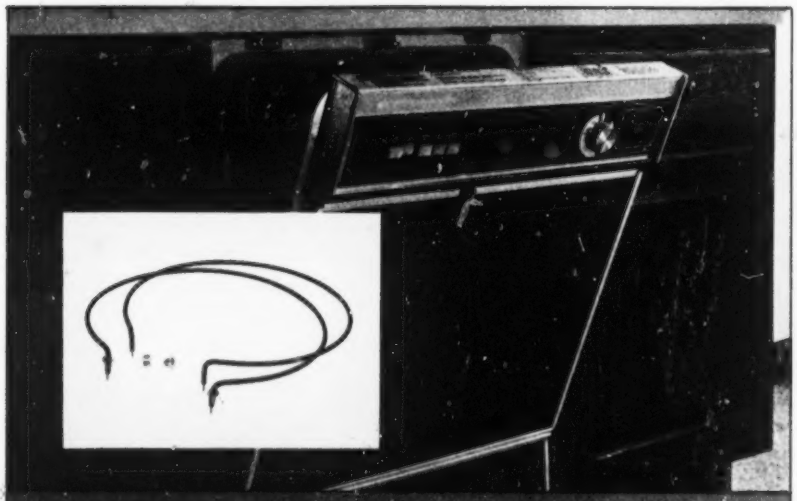
(continued)

Robot Applications



Based on total number of robots in responding plants, and planned applications for robots to be purchased

Source: PRODUCTION Research Dept



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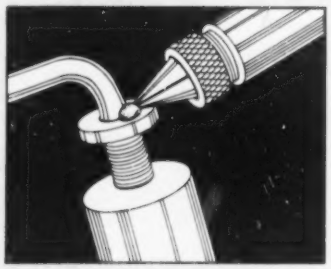

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unloading die castings but the variety of other applications appears to be almost endless. Welding locomotive parts at the company's Erie, PA, plant now is involving two robots in "the most sophisticated welding operation of its kind in the world" (an eight-hour program). In that plant's next phase, 27 robots will be installed as part of a move to provide 50 percent higher production with 20 percent more workers.

GE claims to have put into use North America's first powder paint robot, and at the Louisville appliance plants robots are used extensively for spray painting and conveyor loading/unloading.

In the Evendale plant, near Cincinnati, robots are used to grit-blast jet engine parts. At Schenectady, experimental work on lathe loading/unloading is going on. In Rutland, VT, robots are used with forging presses. In Lynchburg, VA, they weld mobile radio cases. At Pittsfield, MA, one is used in an integrated bushing processing/packaging operation.

Productivity Solution. Baker claims "U.S. business faces a three-fold choice in the '80s: automate, emigrate, or evaporate." For GE's part, where it has a choice, it will accept the cost of doing business domestically and will automate, he says.

The present very real American productivity problem "is at least in part the result of management failure to employ technology that has been right in front of our noses for quite some time." GE is seizing on that technology to the tune of $2 billion invested in productivity improvements last year, and "we're closing the loop both as a user and supplier of products for the automation islands and communication bridges that will, within a few years, produce a true 'factory of the future' and reverse the sorry decline in American productivity growth," he declares.

Howard C. Tuttle □